

## ABSTRACT

### BULK SYNTHESIS OF METAL AND METAL BASED DIELECTRIC NANOWIRES

A process of synthesizing metal and metal nitride nanowires, the steps comprising of: forming a catalytic metal (such as gallium, and indium) on a substrate (such as fused silica quartz, pyrolytic boron nitride, alumina, and sapphire), heating the combination in a pressure chamber, adding gaseous reactant and/or solid metal source, applying sufficient microwave energy (or current in hot filament reactor) to activate the metal of interest (such as gold, copper, tungsten, and bismuth) and continuing the process until nanowires of the desired length are formed. The substrate may be fused silica quartz, the catalytic metal a gallium or indium metal, the gaseous reactant is nitrogen and/or hydrogen and the nanowires are tungsten nitride and/or tungsten.